CLAIMS:

1. A method for detection of a target nucleic acid sequence (1A) in a mixture of different nucleic acids (5) having additional binding sites (10) comprising the subsequent steps:

A) hybridizing the target nucleic acid sequence with a probe (15) in liquid phase, the probe having a first label (20),

B) separating the different nucleic acids (1A, 5),

C) detecting the target nucleic acid (1A) by using the labeled probe (15).

2. Method according to claim 1,

wherein prior to step B) in a step A1) the additional binding sites (10) are hybridized with single stranded nucleic acids (25) having random primary sequences in liquid phase.

3. Method according to claim 2,

- wherein short nucleic acids having a length of 6 to 12 nucleotides are provided in step A1) for hybridizing.

4. Method according to claim 2 or 3,

- wherein hybridizing in step A1) is carried out at roughly room temperature and
- hybridizing in step A) is carried out at a temperature between 56°C to 72°C.

5. method according to claim 2 or 3,

- wherein a nucleic acid with a length of at least 10-times the length of the single stranded nucleic acids (25) with random primary sequence is used as a probe (15),
- wherein step A1) and step A) are carried out simultaneously.

6. Method according to claim 3 or any of the claims 4 or 5,

- wherein in step A1) nucleic acids (25) labeled with a second label (30) are used for hybridizing,

- the second label (30) being different from the first label (20).

7. Method according to claim 3 or any of the claims 4 or 5,

- wherein the nucleic acids (25) used for hybridizing in step A1) are subsequently labeled with a second label (30) after step A1),

- the second label being different from the first label.

8. Method according to claim1 or any of the claims 2 to 7,

- wherein prior to step A) the mixture of different nucleic acids is denatured in a step A2).

9. Method according to claim 1 or any of the claims 2 to 8,

- wherein in step A) a nucleic acid is used as a probe (15), having a stretch of 18 to 25 nucleotides being able to hybridize with the target nucleic acid sequence (1A), this stretch having at least 80% sequence homology to the complementary sequence of the target nucleic acid sequence.

10. Method according to claim 1 or any of the claims 2 to 9,

- wherein in step B) the nucleic acids are separated according to their mass by using a gel electrophorese.

11. Method according to claim 1 or any of the claims 2 to 10,

- wherein in step B) a microfluidic chip having capillaries suitable for nucleic acid electrophorese is used for separation.

12. Method according to claim 1 or any of the claims 2 to 11,

- wherein a first and if present a second label is used, each being selected from the

following group:

- radioactive labels, fluorescent markers, chemoluminescence, bioluminescence, magnetic labels and antigen labels.

13. Method according to claim 12 ,

- wherein fluorescent markers are used as the first and if present second label,

- the fluorescent markers of the first and second label emitting radiation of different wavelengths.

14. Method according to claim 13,

- wherein in step C) the amount and the size of the hybrid strand of the target nucleic acid (1A) and the probe (15) is determined via the first label (20) and in case the second label (30) is present, the amount of the other different nucleic acids (5) in the mixture is determined via the second label (30),

- using a spectrometer for the detection of both labels.

A kit for performing a separation method according to claim 2 or any of the claims 3 to 7, comprising:

- a probe (15) labeled with a first label (20), able to hybridize with a target nucleic acid sequence (1A),

- oligonucleotides (25) with a randomized primary sequence for hybridizing to the additional binding sites (10) present in the mixture of nucleic acids,

- means for carrying out the separation of nucleic acids according to their mass.

Kit according to the previous claim,

- wherein the means for carrying out a separation of the nucleic acids include a microfluidic chip.

15. Kit according to claim 15 or 16, further comprising:

- a second label (30) for labeling the oligonucleotides (25) with randomized primary sequence.